

Claims

1. An aqueous solution for electrodepositing tin-zinc alloys comprising the following components:

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- a) Zn(II) ions;
- b) Sn(II) ions;
- c) aliphatic carboxylic acids and/or alkali salts thereof;
- d) anionic surfactants;
- e) non-ionic surfactants.

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2. A solution according to claim 1 which additionally comprises aromatic aldehydes and/or aromatic ketones.

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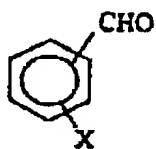
3. A solution according to claim 2 wherein the aromatic aldehydes and/or aromatic ketones have the formula (I)



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wherein AR = phenyl, naphthyl; R = CH₂, CH = CH and R' = H, C₁₋₃ alkyl.

4. A solution according to claim 2, characterised in that the aromatic aldehydes have the formula (II)



(II)

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wherein X = H, CH₃, OCH₃, Cl, Br.

5. A solution according to claim 1, wherein the solution has a pH value of 2 - 8.

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6. A solution according to claim 5, wherein the solution has a pH value of 3 - 5.

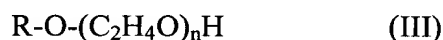
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7. A solution according to claim 1, wherein the Sn(II) and Zn(II) ions are contained as chlorides, sulfates or alkyl sulfonates and, optionally, conducting salts of pertinent anions are also contained.

8. A solution according to claim 1, wherein the aliphatic carboxylic acids are hydroxy carboxylic acids and/or amino carboxylic acids or alkali salts thereof.

9. A solution according to claim 8, wherein the carboxylic acids are citric acid or alkali salts thereof.

10. A solution according to claim 1, wherein the non-ionic surfactants have the formula (III)

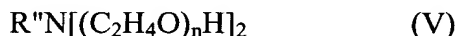


wherein R represents an alkyl, aryl, alkylaryl radical and $n = 1 - 100$.

11. A solution according to claim 10, which additionally comprises non-ionic surfactants of the formula (IV)



and/or of the formula (V)

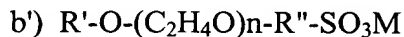


wherein $R' = C_{1-3}$ alkyl or $-(C_2H_4)_nH$; $R'' = C_{5-20}$ alkyl and $n = 1 - 100$.

12. A solution according to claim 1, wherein the anionic surfactants include one or more of the compounds of the formulae (VI) to (IX)

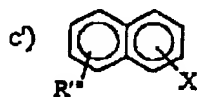


wherein $R = C_{3-12}$ alkyl; $X = H, -SO_3M$; $M = Na, K, NH_4$



(VII)

wherein $R' = C_{3-12}$ alkyl; $R'' = C_{2-5}$ alkyl, $M = Na, K, NH_4$

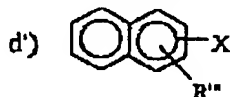


(VIII)

5 wherein $R''' = H, C_{1-5}$ alkyl, $O-(C_2H_4O)_n-X$; or

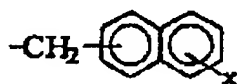


and $X = SO_3M$ with $M = Na, K, NH_4$



(IX)

wherein $R''' = H, C_{1-5}$ alkyl, $O-(C_2H_4O)_n-X$; or



and $X = SO_3M$ with $M = Na, K, NH_4$

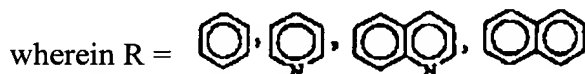
with $n = 0 - 100$, preferably $6 - 15$

13. A solution according to claim 1, which additionally comprises aromatic and/or heterocyclic carboxylic acids or alkali salts thereof.

14. A solution according to claim 13, wherein the carboxylic acids have the formula (XIV)



(XIV)



and $M = H, Na, K, NH_4$